Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

FOURTH SEM B.Tech. (I&CE)DEGREE END SEMESTER EXAMINATION
May/June 2016
SUBJECT: INDUSTRIAL INSTRUMENTATION (ICE - 2202)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **all** full questions.

1A. With the help of a neat schematic diagram, explain the principle and working of a disappearing filament optical pyrometer.

1B. Compare any three characteristics of thermistor, thermocouple and RTD.

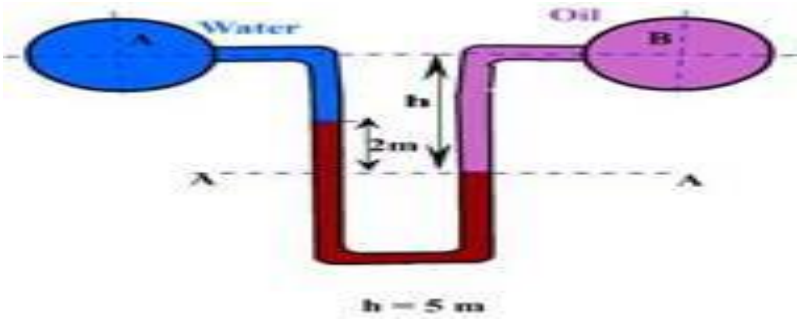
1C. Explain principle and working of bimetallic thermometers with neat diagram.

(5+3+2)

2A. Explain the working principle and constructional details of following pressure measuring devices:(i)Bourdon tube.(ii)Ionisation gauge.

2B. Discuss how LVDT can be used as secondary transducers for pressure measurement using a bourdon tube. Discuss any other preferable substitution for LVDT for the same application.

2C. Two pipes on the same elevation convey water and oil of specific gravity 1 and 0.88 respectively. They are connected by a U-tube manometer with the manometric liquid having a specific gravity of 1.25. If the manometric liquid in the limb connecting the water pipe is 2 m higher than the other find the pressure difference in two pipes. Given : h=5m



(5+3+2)

3A. With the help of neat schematic diagram and suitable equations explain the working of heat transfer type mass flow meter.

3B. Describe ultrasonic and Doppler type flow meters with necessary diagrams.

3C. List any four factors that dictate the flow pattern of a multiphase flow in a conduit.

(5+3+2)

4A. Elaborate on the principle and working of following level sensors:

(i)Capacitive level sensor (ii)Ultrasonic level sensor (iii)Gas purge level sensor

4B. Differentiate the following terms:

(i)Kinematic viscosity and dynamic viscosity (ii)Specific humidity and absolute humidity

4C. Explain how the thickness of a material can be measured using inductive method.

(5+3+2)

5A. With the help of neat schematic diagram, explain the working of :

(i) Piezoelectric type accelerometer.

(ii) Strain gauge type accelerometer.

5B. Briefly describe the working of a stroboscope for angular velocity measurement. Discuss about the major errors that can be caused while using stroboscope.

5C. An accelerometer has input range of 0-10g, natural frequency 30Hz and mass 0.001kg. Then find the range of the secondary displacement transducer in mm required to cover the input range.

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